



## **HINGHAM CONTRIBUTORY RETIREMENT SYSTEM**

**ACTUARIAL VALUATION**

**as of**

**January 1, 2018**

Prepared by:

KMS Actuarial, LLC  
814 Elm Street, Suite 204  
Manchester, NH 03101

January, 2019



January 14, 2019

Hingham Contributory Retirement Board  
Town of Hingham  
210 Central Street  
Hingham, MA 02043

Dear Board Members:

We are pleased to present the enclosed report providing the results of our actuarial valuation of the Hingham Contributory Retirement System as of January 1, 2018. Our valuation was performed in accordance with the provisions contained in Chapter 32 of the Massachusetts General Laws, "M.G.L.", as of January 1, 2018. Disclosures under GASB Statement No. 67, Financial Reporting for Pension Plans (GASB 67) and GASB Statement No. 68, Accounting and Financial Reporting for Pensions (GASB 68) are provided in a separate report.

The principal results of our valuation are summarized in Section 2. The Summary of Plan Provisions and Actuarial Methods and Assumptions are shown in Sections 5 and 6, respectively. Section 7 summarizes the demographic profile of active members, retired plan members and beneficiaries and disabled plan members. Asset information and actuarial liabilities are presented in Section 2. The development of the required appropriations pursuant to Chapter 32 of the M.G.L. is shown in Section 3, including a 30-year forecast of the required appropriations and projected cash flows. The summary of information for PERAC is presented in Section 4.

This valuation is based upon member data provided by the Hingham Contributory Retirement Board and asset information reported to the Public Employee Retirement Administration Commission (PERAC) by the Retirement Board. Although we did not audit the data used in the valuation, we believe that the information is complete and reliable.

Liabilities presented in this report are based on a long-term investment return rate assumption of 7.5%, net of investment expense, compounded annually.

This report was completed in accordance with generally accepted actuarial standards and procedures, and conforms to the Code of Professional Conduct of the American Academy of Actuaries. The actuarial assumptions used in the determination of costs are reasonably related to the experience of the System and to reasonable expectations, and represent our best estimate of anticipated long-term experience under the System.

Future actuarial valuation results may differ significantly from the current results presented in this report. Examples of potential sources of volatility include plan experience differing from that anticipated by the economic or demographic assumptions, the effect of new entrants, changes in economic or demographic assumptions, the effect of law changes and the delayed effect of smoothing techniques.

Our valuation follows generally accepted actuarial methods and we perform such tests as we consider necessary to assure the accuracy of the results. The amounts presented in this report have been appropriately determined according to the actuarial assumptions and methods stated herein.

This report is intended for the sole use of the Hingham Contributory Retirement System and is intended to provide information to comply with the stated purpose of the report. It may not be appropriate for other purposes.

The undersigned credentialed actuaries are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinion contained herein. They are available to answer any questions with regard to this report.

Respectfully submitted,



---

Linda L. Bournival, FSA  
Member, American Academy of Actuaries  
(603) 792-9494



---

Amanda J. Makarevich, ASA  
Member, American Academy of Actuaries  
(603) 702-8009



---

David M. Mirabito, FSA  
Member, American Academy of Actuaries  
(978) 766-5532

---

## TABLE OF CONTENTS

<b>SECTION 1 -</b>	<b>SUMMARY</b>	<b>1</b>
<b>SECTION 2 -</b>	<b>PRINCIPAL VALUATION RESULTS</b>	<b>6</b>
	Exhibit 2.1 - PLAN ASSETS	
	Exhibit 2.2 - ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS	
	Exhibit 2.3 - ACTUARIAL ACCRUED LIABILITY	
	Exhibit 2.4 - UNFUNDED ACTUARIAL ACCRUED LIABILITY	
	Exhibit 2.5 - NORMAL COST	
	Exhibit 2.6 - ACTUARIAL EXPERIENCE	
<b>SECTION 3 -</b>	<b>CHAPTER 32 OF M.G.L. APPROPRIATIONS</b>	<b>14</b>
	Exhibit 3.1 - ANNUAL APPROPRIATIONS	
	Exhibit 3.2 - 30-YEAR FORECAST OF ANNUAL APPROPRIATIONS	
	Exhibit 3.3 - 30-YEAR FORECAST OF CASH FLOW	
<b>SECTION 4 -</b>	<b>REQUIRED DISCLOSURES</b>	<b>18</b>
	Exhibit 4.1 - GASB 67 AND GASB 68 DISCLOSURES	
	Exhibit 4.2 - PERAC DISCLOSURE INFORMATION	
<b>SECTION 5 -</b>	<b>SUMMARY OF PLAN PROVISIONS</b>	<b>20</b>
<b>SECTION 6 -</b>	<b>ACTUARIAL ASSUMPTIONS AND METHODS</b>	<b>25</b>
<b>SECTION 7 -</b>	<b>PLAN MEMBER INFORMATION</b>	<b>29</b>
	Exhibit 7.1 - ACTIVE MEMBERS BY AGE and YEARS OF SERVICE	
	Exhibit 7.2 - RETIRED and DISABLED PLAN MEMBERS and BENEFICIARIES	
<b>SECTION 8 -</b>	<b>GLOSSARY OF TERMS</b>	<b>31</b>
<b>SECTION 9 -</b>	<b>RESULTS BY DEPARTMENT</b>	<b>33</b>

---

## SECTION 1 - SUMMARY

### Background

We have completed the Actuarial Valuation of the Hingham Contributory Retirement System as of January 1, 2018. This valuation is based upon census data provided by the Retirement Board and asset information reported to the Public Employee Retirement Administration Commission (PERAC) by the Hingham Contributory Retirement Board. Information for the prior valuation completed as of January 1, 2016 was obtained from the valuation report prepared by KMS Actuaries, LLC.

### Massachusetts General Laws

The valuation was prepared in accordance with Chapter 32 of the Massachusetts General Laws ("M.G.L."). The results are based on the active, inactive and retired members and beneficiaries as of January 1, 2018, the assets as of December 31, 2017 and assumptions regarding investment returns, salary increases, death, turnover, disability and retirement.

The valuation does not take into consideration:

- Changes in the law after the valuation date,
- Transfers between retirement systems pursuant to Section 3(8)(c) of Chapter 32,
- State-mandated benefits and
- Cost-of-living increases granted to members in pay status between 1982 and 1997.

### GASB Statement Numbers 67 and 68

In June 2012, the GASB approved two related Statements that significantly changed the way pension plans and governments account and report pension liabilities. Effective for plans with fiscal years beginning after June 15, 2013, GASB Statement No. 67, Financial Reporting for Pension Plans, replaced the requirements of Statement No. 25 and effective for employers with fiscal years beginning after June 15, 2014, GASB Statement No. 68, Accounting and Financial Reporting for Pensions, replaced the requirements of Statement No. 27.

The new pension standards reflect changes from those previously in place regarding how governments calculate total pension liability and pension expense. Further, the new standards contain requirements for disclosing information in the notes to financial statements and presenting required supplementary information following the notes.

The required disclosures and notes under the new GASB Statements for the fiscal year ending December 31, 2017 are provided in a separate report.

## SECTION 1 - SUMMARY

### Actuarial Valuation

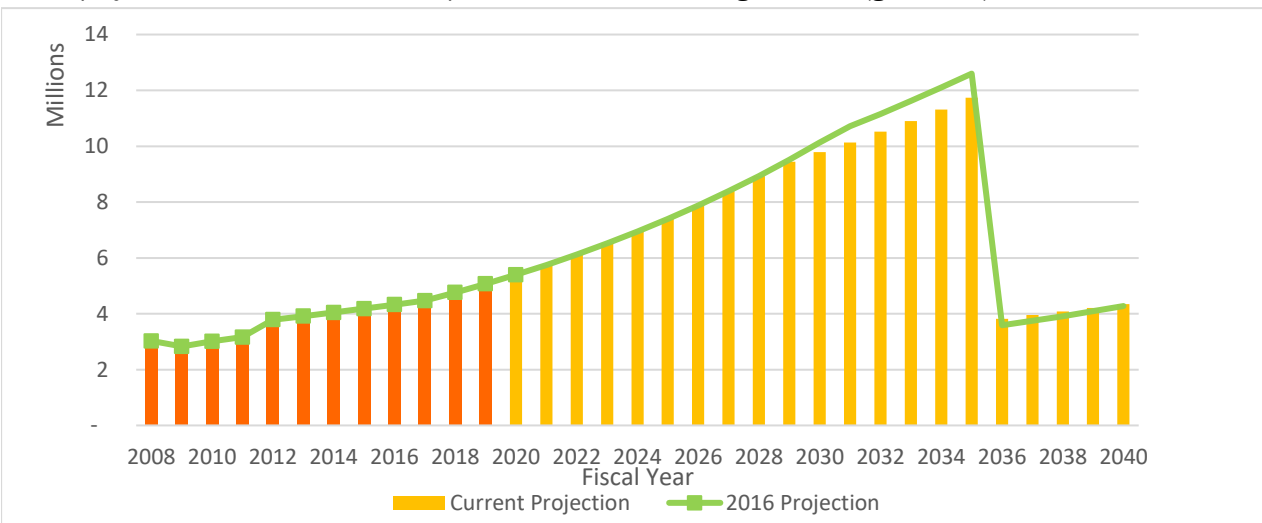
During the two years since the last valuation, the total unfunded actuarial accrued liability of the System was expected to increase from \$47,828,975 as of January 1, 2016 to \$48,511,839 as of January 1, 2018, for a total increase of \$682,864. The actual unfunded actuarial accrued liability, before any assumption or plan changes, was \$43,042,630, resulting in an actuarial gain of \$5,469,209. The actuarial gain was primarily due to an asset loss of \$643,625 and a demographic experience gain of \$6,112,834. The details of the gain and loss analysis are provided in Exhibit 2.6.

### Appropriations

The funding appropriation for each year is computed as the sum of the normal cost, net 3(8)(c) transfers and an amortization payment to pay off the Unfunded Actuarial Liability, adjusted for annual payments of the appropriation made July 1. The appropriation calculated as of the January 1, 2018 valuation is \$5,911,107, and is made up of a normal cost payment of \$2,347,867, net 3(8)(c) transfers of \$0, and an amortization payment of \$3,563,240. The amortization method is an increasing amortization of the unfunded actuarial accrued liability at 4% over 17 years and is expected to fully pay the unfunded actuarial accrued liability by the year 2035. The development of the appropriation as of January 1, 2018 is presented in Exhibit 3.1.

For fiscal year 2019, we show the actual appropriation developed under the previous funding schedule and reported on the PERAC "Required Fiscal Year 2019 Appropriation" letter dated November 16, 2017 of \$5,067,843. For fiscal year 2020, we developed an annual appropriation of \$5,397,253, which is made up of a normal cost and net 3(8)(c) transfers of \$2,416,432 and payment toward the unfunded actuarial accrued liability of \$2,980,821. The unfunded actuarial accrued liability is expected to be fully paid by 2035. The Board adopted a schedule that limits the annual increase in appropriation to 6.5% for each year. The current funding schedule is shown in Exhibit 3.2.

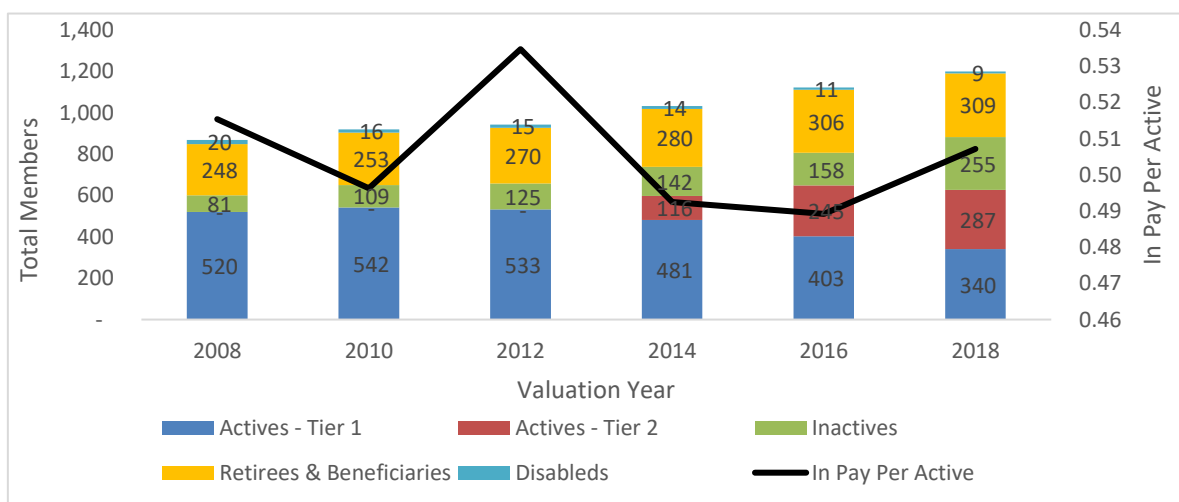
The chart below shows the historical (orange bars) and projected (yellow bars) annual appropriations compared to the projected amounts shown in the prior valuation and funding schedule (green line).



## SECTION 1 - SUMMARY

A summary of principal valuation results from the current valuation and the prior valuation follows. Changes in actuarial assumptions and methods and Plan provisions are discussed below, as well as changes in census data and asset information.

Valuation Date	<u>1/1/2018</u>	<u>1/1/2016</u>	<u>Increase/ (Decrease)</u>
<b>Summary of Member Data</b>			
Active Members	627	648	(3.2%)
Average Age	48.2	47.7	1.1%
Average Service	10.2	9.8	3.7%
Valuation Salary	\$32,309,535	\$30,179,469	7.1%
Average Salary	\$51,530	\$46,573	10.6%
Retired Members and Beneficiaries	309	306	1.0%
Average Age	74.3	73.9	0.5%
Total Annual Retirement Allowance	\$7,955,610	\$7,411,780	7.3%
Average Annual Retirement Allowance	\$25,746	\$24,222	6.3%
State Reimbursed COLAs	\$60,430	\$78,555	(23.1%)
Total System-Funded Retirement Allowance	\$7,895,180	\$7,333,225	7.7%
Disabled Members	9	11	(18.2%)
Average Age	69.2	69.2	0.0%
Total Annual Retirement Allowance	\$352,704	\$375,598	(6.1%)
Average Annual Retirement Allowance	\$39,189	\$34,145	14.8%
State Reimbursed COLAs	\$3,600	\$6,807	(47.1%)
Total System-Funded Retirement Allowance	\$349,104	\$368,791	(5.3%)
Inactive Members	255	158	61.4%
Annuity Savings Fund	\$2,222,174	\$1,031,767	115.4%



## SECTION 1 - SUMMARY

Valuation Date	<u>1/1/2018</u>	<u>1/1/2016</u>	<u>Increase/ (Decrease)</u>
<b>Funded Status - Market Value of Assets</b>			
Actuarial Accrued Liability (AAL)	\$162,064,331	\$148,847,803	8.9%
Market Value of Assets (MVA)	\$119,451,144	\$95,570,393	25.0%
Unfunded Accrued Liability	\$42,613,187	\$53,277,410	(20.0%)
Funded Status	73.7%	64.2%	14.8%
<b>Funded Status - Actuarial Value of Assets</b>			
Actuarial Accrued Liability (AAL)	\$162,064,331	\$148,847,803	8.9%
Actuarial Value of Assets (AVA)	114,967,923	\$101,018,828	13.8%
Unfunded Accrued Liability	\$47,096,408	\$47,828,975	(1.5%)
Funded Status	70.9%	67.9%	4.4%
<b>Normal Cost</b>			
Total Normal Cost	\$5,029,120	\$4,627,321	8.7%
Employee Normal Cost	2,831,253	2,734,638	3.5%
Administrative Expenses	150,000	150,000	0.0%
Net Employer Normal Cost	\$2,347,867	\$2,042,683	14.9%
<b>Appropriations</b>			
Fiscal Year 2018	N/A	\$4,758,538	N/A
Fiscal Year 2019	\$5,067,843	\$5,067,843	0.0%
Fiscal Year 2020	\$5,397,253	\$5,397,253	0.0%
Fiscal Year 2021	\$5,748,074	\$5,748,074	0.0%

### Actuarial Assumptions and Methods

All Actuarial Assumptions and Methods used in this valuation are the same as those used in the last valuation, except the investment return rate was reduced from 7.75% to 7.5%. Changing this assumption resulted in a net increase in the unfunded actuarial accrued liability of \$4,053,778 and an increase in the employer normal cost of \$239,547. The Actuarial Assumptions and Methods utilized in this valuation are detailed in Section 6, Actuarial Assumptions and Methods.

### Plan Provisions

All Plan provisions used in this valuation are the same as those used in the prior valuation, and are summarized in Section 5, Summary of Plan Provisions.



---

## SECTION 1 - SUMMARY

### Census Data

As of January 1, 2018, there are 627 active members who may be eligible for benefits in the future, 309 retirees and beneficiaries, 255 inactives and 9 disabled retirees. Summaries of the active, retired and disabled employees are included in Section 7, Demographic Information.

### Assets

This valuation is based upon asset information reported to the Public Employee Retirement Administration Commission (PERAC) by the Hingham Contributory Retirement Board. The market value of assets increased from \$95,570,393 as of December 31, 2015 to \$119,451,144 as of December 31, 2017. During the plan years ended 2016 and 2017, the market value rates of return were 8.71% and 18.05%, respectively.

The actuarial value of assets increased from \$101,018,828 as of January 1, 2016 to \$114,967,923 as of January 1, 2018. During the plan years ended 2016 and 2017, the rates of return on the actuarial value of assets were 6.71% and 8.21%, respectively.

## SECTION 2 - PRINCIPAL VALUATION RESULTS

### Exhibit 2.1 - Plan Assets

Asset information is reported annually to the Public Employee Retirement Administration Commission by the Hingham Contributory Retirement System. The Market Value of Assets for the three most recent calendar years are as follows:

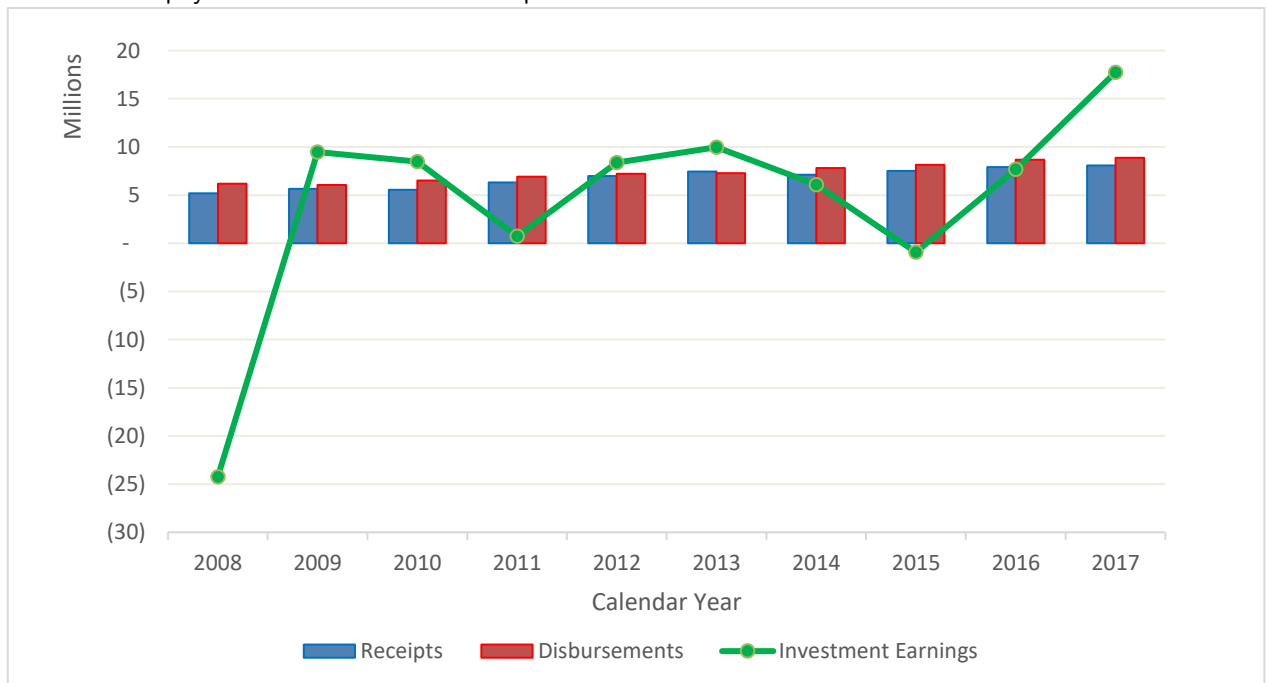
Calendar Year	2017	2016	2015
<b>Trust Fund Composition at Year-End</b>			
Cash	\$510,481	\$424,893	\$524,468
Short-Term Investments	0	0	0
Fixed Income Securities	0	0	0
Equities	0	0	0
Pooled Short Term Funds	0	0	0
Pooled Domestic Equity Funds	0	29,094,569	25,796,886
Pooled International Equity Funds	0	13,137,835	13,934,234
Pooled Global Equity Funds	0	0	0
Pooled Domestic Fixed Income Funds	0	16,379,651	17,169,704
Pooled International Fixed Income Funds	0	9,519,070	8,557,766
Pooled Global Fixed Income Funds	0	0	0
Pooled Alternative Investments	0	3,720,838	2,214,585
Pooled Real Estate Funds	0	11,812,761	11,014,578
Pooled Domestic Balanced Funds	0	0	0
Pooled International Balanced Funds	0	11,588,195	9,413,329
Hedge Funds	0	4,938,587	4,734,093
PRIT Cash	282	10,174	40
PRIT Fund	118,810,611	1,828,421	2,100,160
Interest Due & Accrued	0	0	0
Prepaid Expenses	0	0	0
Accounts Receivable	143,948	72,788	123,874
Land	0	0	0
Buildings	0	0	0
Accumulated Depreciation - Buildings	0	0	0
Accounts Payable	(14,178)	(37,643)	(13,324)
Total Market Value of Assets	<u>\$119,451,144</u>	<u>\$102,490,139</u>	<u>\$95,570,393</u>

## SECTION 2 - PRINCIPAL VALUATION RESULTS

Exhibit 2.1 - Plan Assets

Calendar Year	2017	2016	2015
<b>Funds</b>			
Annuity Savings Fund	\$28,706,885	\$27,394,062	\$25,706,050
Annuity Reserve Fund	6,470,726	6,281,150	6,463,632
Special Military Service Fund	13,922	13,908	5,548
Pension Fund	2,307,718	4,233,448	4,572,100
Expense Fund	0	0	0
Pension Reserve Fund	81,951,893	64,567,571	58,823,063
Total Market Value of Assets	<u>\$119,451,144</u>	<u>\$102,490,139</u>	<u>\$95,570,393</u>
<b>Asset Activity</b>			
Market value as of Beginning of Year	\$102,490,139	\$95,570,393	\$97,128,837
Contributions and Receipts	8,084,575	7,907,648	7,507,768
Benefit Payments and Expenses	(8,864,905)	(8,677,246)	(8,145,549)
Investment Return	17,741,335	7,689,344	(920,663)
Market Value as of End of Year	<u>\$119,451,144</u>	<u>\$102,490,139</u>	<u>\$95,570,393</u>
<b>Rate of Return</b>	18.05%	8.71%	-0.49%

Below are the receipts and disbursements during the last 10 years. The green line reflects investment gains and losses, which vacillate as investment markets fluctuate. Blue bars indicate contributions, from employees and employers, and red bars show benefit payments and administrative expenses.



## SECTION 2 - PRINCIPAL VALUATION RESULTS

### Exhibit 2.1 - Plan Assets

The Actuarial Value of Assets is the market value of assets as of the valuation date adjusted to phase in investment gains and losses over a 5-year period, further constrained to be within 10% of the market value of assets. Investment gains and losses are the excess or deficiency of the expected returns over the actual returns.

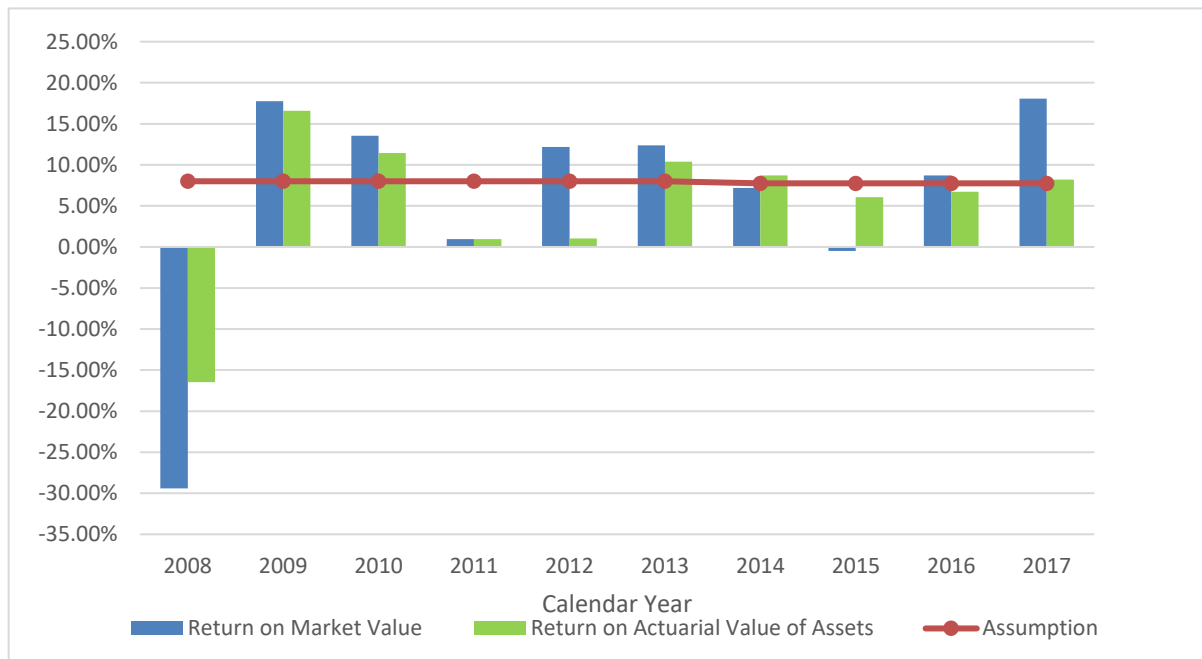
Valuation Date	1/1/2018	1/1/2017	1/1/2016
<b>1. Market Value of Assets as of prior January 1</b>	<b>\$102,490,139</b>	<b>\$95,570,393</b>	<b>\$97,128,837</b>
a. Prior Year Contributions and Receipts	8,084,575	7,907,648	7,507,768
b. Prior Year Benefit Payments and Expenses	(8,864,905)	(8,677,246)	(8,145,549)
c. Expected Investment Return Rate	7.75%	7.75%	7.75%
d. Expected Investment Return	7,912,748	7,376,884	7,502,771
e. Expected Market Value of Assets as of Valuation Date	\$109,622,557	\$102,177,679	\$103,993,827
<b>2. Prior Year Gain / (Loss)</b>			
a. Market Value of Assets as of January 1	\$119,451,144	\$102,490,139	\$95,570,393
b. Expected Market Value of Assets	109,622,557	102,177,679	103,993,827
c. Prior Year Gain / (Loss)	9,828,587	312,460	(8,423,434)
<b>3. Phase-In of Asset Gains and Losses</b>			
Calendar Year	Gain / (Loss)	Unrecognized Gain / (Loss)	Unrecognized Gain / (Loss)
a. 2017	\$9,828,587	\$7,862,870	-
b. 2016	312,460	187,476	249,968
c. 2015	(8,423,434)	(3,369,374)	(5,054,060)
d. 2014	(988,755)	(197,751)	(395,502)
e. 2013	3,446,695	-	689,339
f. 2012	2,524,437	-	-
g. Total deferred gains/(losses)		4,483,221	(4,510,255)
			(5,448,435)

## SECTION 2 - PRINCIPAL VALUATION RESULTS

### Exhibit 2.1 - Plan Assets

Valuation Date	1/1/2018	1/1/2017	1/1/2016
<b>4. Actuarial Value of Assets</b>			
a. Market Value of Assets	\$119,451,144	\$102,490,139	\$95,570,393
b. Deferred gains/(losses)	4,483,221	(4,510,255)	(5,448,435)
c. Market Value of Assets Less deferred gains/(losses)	\$114,967,923	\$107,000,394	\$101,018,828
d. 90% of Market Value of Assets	107,506,030	92,241,125	86,013,354
e. 110% of Market Value of Assets	131,396,258	112,739,153	105,127,432
f. Actuarial Value of Assets, a., but not less than b. and not greater than c.	\$114,967,923	\$107,000,394	\$101,018,828
g. Ratio of Actuarial Value of Assets to Market Value of Assets	96.25%	104.40%	105.70%
<b>5. Rate of Return on Actuarial Value of Assets for Prior Calendar Year</b>	<b>8.21%</b>	<b>6.71%</b>	<b>6.07%</b>

Below are the investment returns during the last 10 years. The red line reflects the investment return actuarial assumption. Blue bars indicate investment return rates on market value of assets, and green bars show investment return rates on actuarial value of assets.



## SECTION 2 - PRINCIPAL VALUATION RESULTS

### Exhibit 2.2 - Actuarial Present Value of Future Benefits

The **Actuarial Present Value of Future Benefits** is the present value of the cost to finance all benefits payable in the future, discounted to reflect the probability of payment and the time value of money. Below is the Actuarial Present Value of Future Benefits from the current valuation and the prior valuation:

Valuation Date	<u>1/1/2018</u>	<u>1/1/2016</u>
Actives	\$124,920,718	\$114,477,934
Retired Members and Beneficiaries	75,281,558	68,573,719
Disabled Members	3,640,559	3,786,368
Inactive Members	2,222,174	1,031,767
Total Present Value of Future Benefits	<u>\$206,065,009</u>	<u>\$187,869,788</u>

### Exhibit 2.3 - Actuarial Accrued Liability

The **Actuarial Accrued Liability** is the portion of the Actuarial Present Value of Future Benefits which is allocated to all periods prior to a valuation year and therefore is not provided for by future Normal Costs. Below is the Actuarial Accrued Liability from the current valuation and the prior valuation:

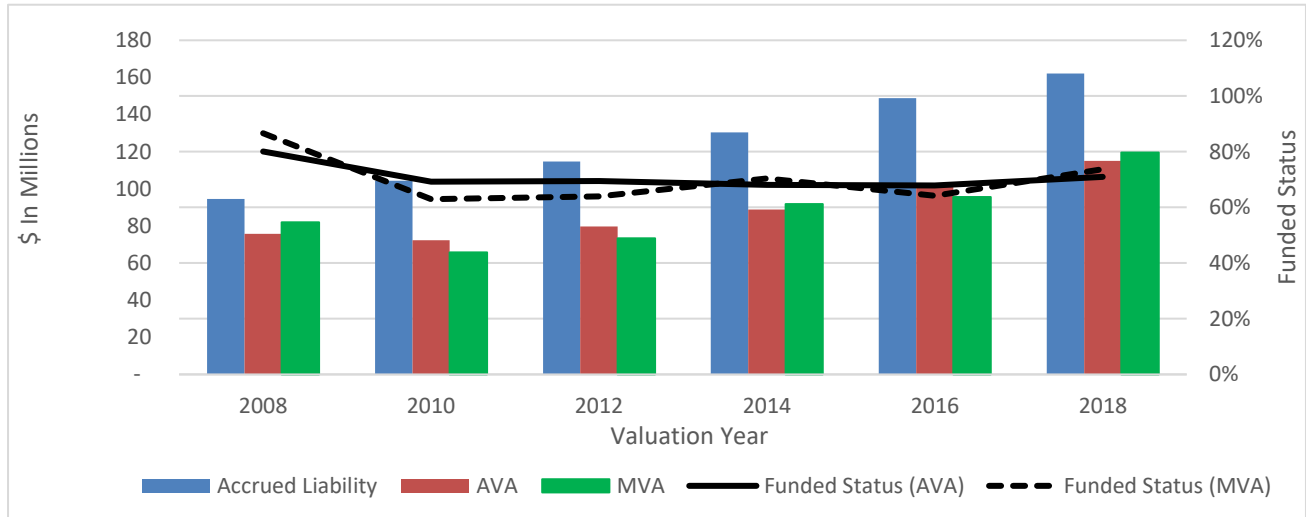
Valuation Date	<u>1/1/2018</u>	<u>1/1/2016</u>
Actives	\$80,920,040	\$75,455,949
Retired Members and Beneficiaries	75,281,558	68,573,719
Disabled Members	3,640,559	3,786,368
Inactive Members	2,222,174	1,031,767
Total Actuarial Accrued Liability	<u>\$162,064,331</u>	<u>\$148,847,803</u>

### Exhibit 2.4 - Unfunded Actuarial Accrued Liability

Valuation Date	<u>1/1/2018</u>	<u>1/1/2016</u>
<b>Unfunded Actuarial Accrued Liability</b>		
a. Actuarial Accrued Liability	\$162,064,331	\$148,847,803
b. Actuarial Value of Assets	114,967,923	101,018,828
c. Unfunded Actuarial Accrued Liability (a. - b.)	\$47,096,408	\$47,828,975
d. Funded Ratio (b. divided by a.)	70.9%	67.9%

## SECTION 2 - PRINCIPAL VALUATION RESULTS

Below are the accrued liabilities, asset values (actuarial and market) and funded status during the last 10 years. The black solid line reflects the funded status on an actuarial value of assets (AVA) basis and the black dotted line reflects the funded status on a market value (MVA) basis. Blue bars indicate actuarial accrued liabilities, red bars indicate actuarial value of assets and green bars indicate market value of assets.



### Exhibit 2.5 - Normal Cost

The **Normal Cost** is the portion of the Actuarial Present Value of Future Benefits which is allocated to a valuation year. Only active employees who have not reached Normal Retirement Age incur a Normal Cost. Below is the Normal Cost from the current valuation and the prior valuation:

Valuation Date	<u>1/1/2018</u>	<u>1/1/2016</u>
<b>Total Normal Cost</b>	\$5,029,120	\$4,627,321
As of Percentage of Salary	15.6%	15.3%
<b>Employee Normal Cost</b>	\$2,831,253	\$2,734,638
As of Percentage of Salary	8.8%	9.1%
<b>Administrative Expenses</b>	\$150,000	\$150,000
As a Percentage of Salary	0.5%	0.5%
<b>Net Employer Normal Cost</b>	\$2,347,867	\$2,042,683
As a Percentage of Salary	7.3%	6.8%

## SECTION 2 - PRINCIPAL VALUATION RESULTS

### Exhibit 2.6 - Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding mortality, retirement, disability and withdrawal rates as well as salary increases and investment returns. A comparison of the results of the current valuation and the prior valuation is made to determine how closely actual experience relates to expected. During the two years since the last valuation, the total unfunded actuarial accrued liability of the System was expected to increase by \$682,864. Below is the development of the Actuarial Gain for the current 2-year period:

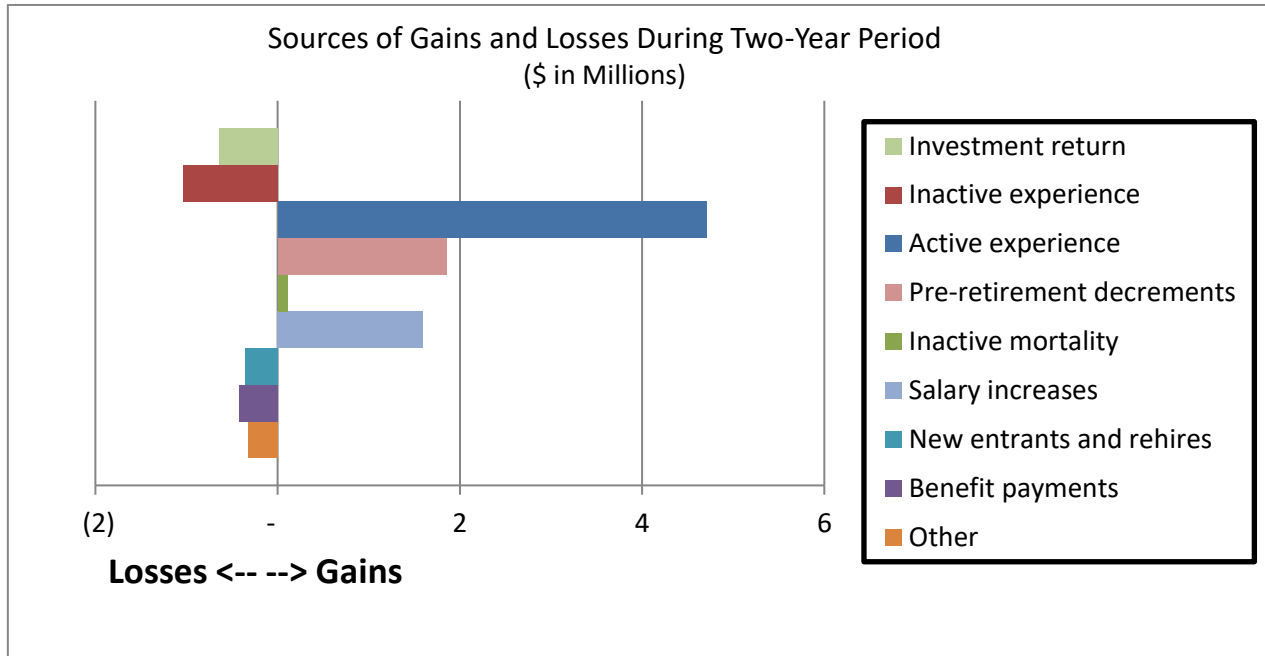
Calendar Year Ending	<u>12/31/2017</u>	<u>12/31/2016</u>
<b>Expected Unfunded Actuarial Accrued Liability</b>		
a. Unfunded Actuarial Accrued Liability, beginning of year	\$48,307,590	\$47,828,975
b. Normal cost, beginning of year	\$4,508,829	4,627,321
c. Total contributions	8,084,575	7,907,648
d. Interest (full year on a. and b., one-half year on c.)	3,779,995	3,758,942
e. Expected Unfunded Actuarial Accrued Liability	\$48,511,839	\$48,307,590
f. Unfunded Actuarial Accrued Liability (before changes)	43,042,630	
g. (Gain)/Loss	(\$5,469,209)	
<b>Asset (gain)/loss</b>		
a. Actuarial value of assets, beginning of year	\$107,000,394	\$101,018,828
b. Contributions and Receipts	8,084,575	7,907,648
c. Benefit Payments and Expenses	(8,864,905)	(8,677,246)
d. Assumed rate of return (prior valuation)	7.75%	7.75%
e. Expected return	8,262,293	7,799,137
f. Actuarial value of assets, end of year	114,967,923	107,000,394
g. Actual return	8,747,859	6,751,164
h. Actual rate of return	8.21%	6.71%
i. Asset (gain)/loss	(\$485,566)	\$1,047,973
j. Total asset (gain)/loss, 2-year period	\$643,625	



## SECTION 2 - PRINCIPAL VALUATION RESULTS

### Exhibit 2.6 - Actuarial Experience

Below are the various sources of gains and losses over the 2-year period. The asset loss during the period was \$643,625, and the total demographic gain during the period was \$6,112,834, which totals to an overall gain of \$5,469,209.



#### Actual Unfunded Actuarial Accrued Liability

a. Changes due to:	
i) Asset (gain)/loss	\$643,625
ii) (Gain)/loss from demographic experience	(6,112,834)
iii) (Gain)/loss prior to changes	(5,469,209)
iv) Plan change	-
v) Assumption change	4,053,778
vi) Total (gain)/loss (including changes)	(1,415,431)
b. Unfunded Actuarial Accrued Liability, end of year	\$47,096,408

---

## SECTION 3 - CHAPTER 32 OF M.G.L. APPROPRIATIONS

### Exhibit 3.1 - Annual Appropriations

The **Annual Appropriation** is determined in accordance with the requirements set forth in Section 22D of Chapter 32 of the Massachusetts General Laws ("M.G.L."). The appropriation is comprised of the annual employer normal cost and amortization payments to pay the unfunded actuarial accrued liability. Below are the details of the annual appropriations for the current and prior valuations, adjusted for annual payments made each July 1. The appropriations shown are based on the results of the valuations and do not account for any adjustments made to appropriations in the selected funding schedule.

<b>Amortization Payments</b>	<b><u>1/1/2018</u></b>	<b><u>1/1/2016</u></b>
a. Unfunded Actuarial Accrued Liability		
Fully Funded Year	2035	2035
Balance as of valuation date	\$47,096,408	\$47,828,975
Amortization Amount	\$3,563,240	\$3,398,204
Increasing Rate	4.00%	4.00%
Remaining Payment Period (from Valuation date)	17	19
b. Total Amortization Payments	\$3,563,240	\$3,398,204
<b>Normal Cost</b>	<b>\$2,347,867</b>	<b>\$2,042,683</b>
<b>Net 3(8)(c) Transfers</b>	<b>\$0</b>	<b>\$0</b>
<b>Total Appropriation as of January 1</b>	<b>\$5,911,107</b>	<b>\$5,440,887</b>
<b>Adjusted for Payments as of July 1</b>	<b>\$6,128,766</b>	<b>\$5,647,788</b>

---

## SECTION 3 - CHAPTER 32 OF M.G.L. APPROPRIATIONS

**Exhibits 3.2 and 3.3** are based on the assumptions below:

**Exhibit 3.2:**

- The Total Normal Cost is expected to increase 4% per year.
- The Unfunded Actuarial Accrued Liability ("UAL") is computed as of January 1 of each year assuming no future gains or losses.
- The Amortization Payment of UAL is an increasing payment at 4% paid over 17 years through 2035.
- Net 3(8)(c) transfers are a level dollar amount based on the net transfers expected to be paid by the Hingham Contributory Retirement Board during the current year offset by the amount received during the same period. For the Hingham Retirement System, we assumed a net transfer of zero.
- Total Employer Cost is the sum of the Employer Normal Cost, net 3(8)(c) transfers and the Amortization of the UAL, all computed as of January 1 of each year and adjusted for annual payments made on July 1.
- For fiscal year 2019, we show the actual appropriation developed under the previous funding schedule of \$5,067,843. For fiscal years 2020 and later, the Board has selected a funding schedule that fully amortizes the unfunded actuarial accrued liability by 2035, with annual employer costs limited to increases of 6.5% over the prior year.

**Exhibit 3.3:**

- Expected benefit payments include payments expected to be made to retired members, beneficiaries, disabled members and active members expected to retire. In addition, expected benefit payments include distribution of the annuity savings fund attributed to inactive members.
- Benefit payments exclude cost-of-living increases granted to members in pay status between 1982 and 1997. In addition, benefit payments are as expected for the first ten years of the forecast, then increase by the greater of 4.5% per year thereafter or the expected future payments for the current population projected by our computer model.
- Calendar year cash flow entries are developed as of each January 1.

## SECTION 3 - CHAPTER 32 OF M.G.L. APPROPRIATIONS

### Exhibit 3.2 - 30-Year Forecast of Annual Appropriations

Fiscal Year Ending	Employer Normal Cost	Amortization Payment of UAL	Net 3(8)(c) Transfers	Total Employer Cost	Increase over Prior Year	Unfunded Actuarial Accrued Liability
2019	\$2,434,320	\$2,633,523	\$0	\$5,067,843		\$47,096,408
2020	2,416,432	2,980,821	-	5,397,253	6.50%	47,898,144
2021	2,470,879	3,277,195	-	5,748,074	6.50%	48,399,924
2022	2,546,047	3,575,652	-	6,121,699	6.50%	48,632,050
2023	2,602,394	3,917,215	-	6,519,609	6.50%	48,572,139
2024	2,675,550	4,267,834	-	6,943,384	6.50%	48,153,595
2025	2,757,143	4,637,561	-	7,394,704	6.50%	47,340,131
2026	2,822,141	5,053,219	-	7,875,360	6.50%	46,082,315
2027	2,902,436	5,484,822	-	8,387,258	6.50%	44,299,199
2028	2,982,225	5,950,205	-	8,932,430	6.50%	41,934,855
2029	3,092,303	6,351,101	-	9,443,404	5.72%	38,910,665
2030	3,178,559	6,605,145	-	9,783,704	3.60%	35,244,003
2031	3,268,340	6,869,351	-	10,137,691	3.62%	31,038,943
2032	3,382,040	7,144,125	-	10,526,165	3.83%	26,244,569
2033	3,474,488	7,429,890	-	10,904,378	3.59%	20,805,725
2034	3,584,048	7,727,085	-	11,311,133	3.73%	14,662,681
2035	3,700,709	8,036,168	-	11,736,877	3.76%	7,750,769
2036	3,821,977	-	-	3,821,977	-67.44%	-
2037	3,953,194	-	-	3,953,194	3.43%	-
2038	4,082,472	-	-	4,082,472	3.27%	-
2039	4,202,967	-	-	4,202,967	2.95%	-
2040	4,339,901	-	-	4,339,901	3.26%	-
2041	4,469,501	-	-	4,469,501	2.99%	-
2042	4,608,820	-	-	4,608,820	3.12%	-
2043	4,750,050	-	-	4,750,050	3.06%	-
2044	4,896,031	-	-	4,896,031	3.07%	-
2045	5,060,950	-	-	5,060,950	3.37%	-
2046	5,239,281	-	-	5,239,281	3.52%	-
2047	5,425,355	-	-	5,425,355	3.55%	-
2048	5,627,902	-	-	5,627,902	3.73%	-

## SECTION 3 - CHAPTER 32 OF M.G.L. APPROPRIATIONS

### Exhibit 3.3 - 30-Year Forecast of Cash Flow

Calendar Year	Market Value of Assets, BOY	Benefit Payments	Employee Contributions	Employer Contributions	Investment Return	Market Value of Assets, EOY
2018	\$119,451,144	\$11,662,807	\$2,831,253	\$4,887,862	\$9,100,414	\$124,607,866
2019	124,607,866	10,160,551	3,055,671	5,205,573	9,584,163	132,292,722
2020	132,292,722	10,751,295	3,218,609	5,543,935	10,175,971	140,479,942
2021	140,479,942	11,406,831	3,370,179	5,904,291	10,803,825	149,151,406
2022	149,151,406	12,004,160	3,548,865	6,288,069	11,473,970	158,458,150
2023	158,458,150	12,606,725	3,720,660	6,696,794	12,192,918	168,461,797
2024	168,461,797	13,170,009	3,894,013	7,132,086	12,967,717	179,285,604
2025	179,285,604	13,629,792	4,093,454	7,595,672	13,811,988	191,156,926
2026	191,156,926	14,111,023	4,288,625	8,089,390	14,735,957	204,159,875
2027	204,159,875	14,536,391	4,495,189	8,615,201	15,750,155	218,484,029
2028	218,484,029	15,025,290	4,683,880	9,108,028	16,857,247	234,107,894
2029	234,107,894	15,701,428	4,907,341	9,436,243	18,045,057	250,795,107
2030	250,795,107	16,407,992	5,139,670	9,777,657	19,313,133	268,617,575
2031	268,617,575	17,146,352	5,361,685	10,152,335	20,666,881	287,652,124
2032	287,652,124	17,917,938	5,617,465	10,517,116	22,112,080	307,980,847
2033	307,980,847	18,724,245	5,870,538	10,909,426	23,654,902	329,691,468
2034	329,691,468	19,566,836	6,131,112	11,320,050	25,301,941	352,877,735
2035	352,877,735	20,447,344	6,402,167	3,686,242	26,455,685	368,974,485
2036	368,974,485	21,367,474	6,679,146	3,812,799	27,658,702	385,757,658
2037	385,757,658	22,329,010	6,974,137	3,937,486	28,912,858	403,253,129
2038	403,253,129	23,333,815	7,294,387	4,053,701	30,220,073	421,487,475
2039	421,487,475	24,383,837	7,616,240	4,185,772	31,582,318	440,487,968
2040	440,487,968	25,481,110	7,963,322	4,310,770	33,001,613	460,282,563
2041	460,282,563	26,627,760	8,319,915	4,445,141	34,480,030	480,899,889
2042	480,899,889	27,826,009	8,694,303	4,581,355	36,019,691	502,369,229
2043	502,369,229	29,078,179	9,084,532	4,722,152	37,622,762	524,720,496
2044	524,720,496	30,386,697	9,477,737	4,881,214	39,291,457	547,984,207
2045	547,984,207	31,754,098	9,880,098	5,053,211	41,028,035	572,191,453
2046	572,191,453	33,183,032	10,297,964	5,232,677	42,834,793	597,373,855
2047	597,373,855	34,676,268	10,723,836	5,428,031	44,714,069	623,563,523

---

## SECTION 4 - REQUIRED DISCLOSURES

### Exhibit 4.1 - GASB 67 and GASB 68 Disclosures

In June 2012, the GASB approved two related Statements that significantly changed the way pension plans and governments account and report pension liabilities. Effective for plans with fiscal years beginning after June 15, 2013, GASB Statement No. 67, *Financial Reporting for Pension Plans*, replaced the requirements of Statement No. 25 and effective for employers with fiscal years beginning after June 15, 2014, GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, replaced the requirements of Statement No. 27.

The new pension standards reflect changes from those currently in place regarding how governments calculate total pension liability and pension expense. Further, the new standards contain requirements for disclosing information in the notes to financial statements and presenting required supplementary information following the notes.

GASB 67 requires defined benefit pension plans, such as the Hingham Contributory Retirement System, to present a statement of fiduciary net position (pension plan assets) and a statement of changes in fiduciary net position. Further, the statement requires that notes to financial statements include descriptive information such as the types of benefits provided, the classes of plan members covered and the composition of the pension plan's retirement board. Finally, GASB 67 requires pension plans to present in required supplementary information the sources of the changes in the net pension liability and information about the actuarially determined contributions compared with the actual contributions made to the plan and related ratios.

GASB 67 and GASB 68 require projected benefit payments be discounted to their actuarial present value using the single rate that reflects:

- (1) a long-term expected rate of return on pension plan investments *to the extent that the pension plan's assets are sufficient to pay benefits and pension plan assets are expected to be invested using a strategy to achieve that return and*
- (2) a tax-exempt, high-quality municipal bond rate *to the extent that the conditions for use of the long-term expected rate of return are not met.*

GASB 68 establishes standards for measuring and recognizing liabilities, deferred outflows of resources, deferred inflows of resources and pension expense by state and local governments.

The effective date for GASB 67 is for plan years beginning after June 15, 2013, which is fiscal year ending December 31, 2014 for the Hingham Contributory Retirement System. The effective date for GASB 68 is for employers' fiscal years beginning after June 15, 2014. The GASB report, submitted under separate cover and prepared as of December 31, 2017 (the measurement date), presents information to assist the Hingham Contributory Retirement System in providing the required information under GASB 68 to participating employers.

---

## SECTION 4 - REQUIRED DISCLOSURES

### Exhibit 4.2 - PERAC Disclosure Information

The most recent actuarial valuation of the System was prepared by KMS Actuaries, LLC as of January 1, 2018.

The normal cost for employees on that date was:	\$2,831,253	8.8% of payroll
The normal cost for the employer was:	\$2,347,867	7.3% of payroll

The actuarial liability for active members was:	\$80,920,040
The actuarial liability for retired and inactive members was:	81,144,291
Total actuarial liability:	\$162,064,331
System assets as of that date:	\$114,967,923
Unfunded actuarial accrued liability:	\$47,096,408

The ratio of System assets to total actuarial accrued liability was:	70.9%
--	-------

The principal actuarial assumptions used in the valuation are as follows:

Investment Return:	7.50%
Rate of Salary Increase:	Based on service, 6% graded down to 4.25% for Group 1
	Based on service, 7% graded down to 4.75% for Group 4

---

## SECTION 5 - SUMMARY OF PLAN PROVISIONS

**Administration**                      There are 104 contributory retirement systems for public employees in Massachusetts. Each system is governed by a retirement board and all boards, although operating independently, are governed by Chapter 32 of the Massachusetts General Laws and other applicable statutes. This law in general provides uniform benefits, uniform contribution requirements and a uniform accounting and funds structure for all systems.

**Participation**                      Participation is mandatory for all full-time employees. Eligibility with respect to part-time, provisional, temporary, seasonal or intermittent employment is governed by regulations promulgated by the local retirement board, and approved by PERAC. Membership is optional for certain elected officials.

There are four classes of membership in the Retirement System:

- |          |  |
|----------|--|
| Group 1: | General employees, including clerical, administrative, technical and all other employees not otherwise classified. |
| Group 2: | Certain specified hazardous duty positions.  |
| Group 3: | State police officers and inspectors.  |
| Group 4: | Local police officers, firefighters and other specified hazardous positions.                                       |

For members in more than one group, participation will be proportional.

**Member Contributions**              Member contributions vary depending on the most recent date of membership:

Prior to 1975:	5% of Salary
1975 – 1983:	7% of Salary
1984 – June 30, 1996:	8% of Salary
July 1, 1996 – present:	9% of Salary
1979 – present:	An additional 2% of Salary in excess of \$30,000.
Group 1 members hired on or after April 2, 2012:	6% of Salary with 30 or more years of creditable service.

**Rate of Interest**                      Interest on regular deductions made after January 1, 1984 is a rate established by PERAC in consultation with the Commissioner of Banks. The rate is obtained from the average rates paid on individual savings accounts by a representative sample of at least ten financial institutions.



## SECTION 5 - SUMMARY OF PLAN PROVISIONS

<b>Retirement Age</b>	The mandatory retirement age for some Group 2 and Group 4 members is age 65. Most Group 2 and Group 4 members may remain in service after reaching age 65. Group 4 members who are employed in certain public safety positions are required to retire at age 65. There is no mandatory retirement age for members in Group 1.
<b>Salary</b>	Gross regular compensation. This does not include bonuses, overtime, severance pay, unused sick leave credit or other similar compensation.
<b>Average Salary</b>	<p>Membership before April 2, 2012: Average annual rate of regular compensation received during the three consecutive years that produce the highest average, or, if greater, during the last three years (whether or not consecutive) preceding retirement.</p> <p>Membership on or after April 2, 2012: Average annual rate of regular compensation received during the five consecutive years that produce the highest average, or, if greater, during the last five years (whether or not consecutive) preceding retirement.</p>
<b>Creditable Service</b>	The period during which a member contributes to the retirement system plus certain periods of military service and "purchased" service.
<b>Benefit Rate</b>	The benefit rate varies with the member's retirement age, Group, membership date and years of creditable service at retirement. Each year a member retires prior to the age at which the 2.5% maximum benefit rate applies, a reduction is applied to each year of age under the maximum age. The maximum age and reduction for each Group and membership date is as follows:

	Group 1	Group 2	Group 4
2.5% for Membership before April 2, 2012:			
Maximum age:	65	60	55
Reduction:	0.1%	0.1%	0.1%
2.5% for Membership on or after April 2, 2012 (less than 30 years of service):			
Maximum age:	67	62	57
Reduction:	0.15%	0.15%	0.15%
2.5% for Membership on or after April 2, 2012 (30+ years of service):			
Maximum age:	67	62	57
Reduction:	0.125%	0.125%	0.125%

## SECTION 5 - SUMMARY OF PLAN PROVISIONS

<b>Superannuation Retirement</b>	Eligibility if membership before April 2, 2012:	<ul style="list-style-type: none"> <li>• completion of 20 years of Creditable Service, or</li> <li>• attainment of age 55 if hired prior to 1978, or</li> <li>• attainment of age 55 with 10 years of Creditable Service, if hired after 1978.</li> </ul>
	Eligibility if membership on or after April 2, 2012:	<ul style="list-style-type: none"> <li>• attainment of age 60 with 10 years of Creditable Service if classified in Group 1</li> <li>• attainment of age 55 with 10 years of Creditable Service if classified in Group 2</li> <li>• attainment of age 55 if classified in Group 4</li> </ul>
	Benefit Amount	Product of the member's Benefit Rate, Average Salary and Creditable Service.
	Maximum Benefit	80% of the member's Average Salary.
	Veteran's Benefit	Additional benefit of \$15 per year of Creditable Service, up to a maximum of \$300.
<b>Deferred Vested</b>	Eligibility	<ul style="list-style-type: none"> <li>• completion of ten or more years of Creditable Service.</li> <li>• elected officials hired prior to 1978, completion of six years of Creditable Service.</li> </ul>
	Benefit Amount	Accrued benefit payable commencing at age 55, or the completion of 20 years of Creditable Service, or may be deferred until later at the participant's option.
<b>Withdrawal of Contributions</b>		<p>Contributions may be withdrawn upon termination of employment.</p> <ul style="list-style-type: none"> <li>• Members hired on or after January 1, 1984 who terminate with less than ten years of Creditable Service receive contributions plus interest on the Annuity Savings Account at an annual rate of 3%.</li> <li>• All other withdrawals receive contributions plus 100% of the regular interest that has accrued to the Annuity Savings Account.</li> </ul>

## SECTION 5 - SUMMARY OF PLAN PROVISIONS

<b>Ordinary Disability Retirement</b>	Eligibility	Non-job related disability after completion of ten years of Creditable Service.
	Benefit Amount for Group 1 membership before April 2, 2012 or Group 2 or Group 4	Superannuation benefit determined if the member is age 55, up to a maximum of 80% of Average Salary over three years. If the member is a veteran, 50% of final rate of salary (final year) plus an annuity based on the accumulated member contributions plus credited interest, up to a maximum of 80% of Average Salary over five years.
	Benefit Amount for Group 1 membership on or after April 2, 2012	Superannuation benefit determined if the member is age 60, up to a maximum of 80% of Average Salary over three years. If the member is a veteran, 50% of final rate of salary (final year) plus an annuity based on the accumulated member contributions plus credited interest, up to a maximum of 80% of Average Salary over five years.
<b>Accidental Disability Retirement</b>	Eligibility	Disabled as a result of an accident in the performance of duties. There is no minimum age or service requirement.
	Benefit Amount	72% of Salary plus an annuity based on accumulated member contributions plus credited interest.
	Maximum Benefit	100% of Salary if hired before January 1, 1988, otherwise 75% of Salary.
	Veteran's Benefit	Additional allowance of \$15 per year of Creditable Service, up to a maximum of \$300.
	Supplemental Dependent Allowance	Additional allowance of \$897.72 per year for each child until age 18 (or age 22 if a full-time student).
<b>Non-Occupational Death</b>	Eligibility	For members with at least two years of creditable service who die while in active service, but not due to occupational injury.
	Benefit Amount	Benefit as if Option C had been elected. Minimum benefit of \$250 per month for surviving spouse, \$120 per month for first child and \$90 per month for each additional child.

---

## SECTION 5 - SUMMARY OF PLAN PROVISIONS

<b>Accidental Death</b>	Eligibility	For members who die as a result of an occupational injury.
	Benefit Amount	72% of Salary plus an annuity based on accumulated member contributions plus credited interest.
	Maximum Benefit	100% of Salary if hired before January 1, 1988, otherwise 75% of Salary.
	Veteran's Benefit	Additional allowance of \$15 per year of creditable service, up to a maximum of \$300.
	Supplemental Dependent Allowance	Additional allowance of \$897.72 per year for each child until age 18 (or age 22 if a full-time student).
<b>Cost-of-Living Adjustment (COLA)</b>	In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a Cost-of-Living Adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees and beneficiaries who have been receiving benefit payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is \$13,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the Commonwealth of Massachusetts and are not the liability of the Retirement System.	
<b>Optional Forms of Payment</b>	A member may elect to receive his or her retirement allowance, payable in monthly installments, in one of three forms of payment: <ul style="list-style-type: none"><li>• Option A – Total annual allowance commencing at retirement and terminating at member's death.</li><li>• Option B – A reduced annual allowance commencing at retirement with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member.</li><li>• Option C – A reduced annual allowance commencing at retirement with 66⅔% of benefit continued to designated beneficiary upon death of member. For members who retired on or after January 12, 1988, if the beneficiary pre-deceases the retiree, the benefit payable increases based on the factor used to determine the Option C benefit at retirement. For members who retired prior to January 12, 1988, if the System has accepted Section 288 of Chapter 194 of the Acts of 1998 and the beneficiary pre-deceases the retiree, the benefit payable increases based on the factor used to determine the Option C benefit at retirement.</li></ul>	

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

**Valuation Date** January 1, 2018

**Investment Return** 7.50% per year. Previously, 7.75% per year.  
The investment return assumption is a long-term assumption based on capital market expectations by asset class, historical returns and professional judgment. We considered analysis prepared by PRIM's investment advisor using a building block approach and using the target asset allocation, expected returns by asset class and risk analysis to determine a long-term expected average annual rate of return.

**Annuity Savings Fund Interest Rate** 2.00% per year

**Amortization Method** *Unfunded Actuarial Accrued Liability (UAL):*  
Increasing dollar amount at 4% to reduce the Unfunded Actuarial Accrued Liability to zero on or before June 30, 2035.

**Salary Scale** The assumed annual rates for salary increases including longevity are illustrated by the following rates:

Years of Service	Groups 1 and 2	Group 4
0	6.00%	7.00%
1	5.50%	6.50%
2	5.50%	6.00%
3	5.25%	5.75%
4	5.25%	5.25%
5	4.75%	5.25%
6	4.75%	4.75%
7	4.50%	4.75%
8	4.50%	4.75%
9+	4.25%	4.75%

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

The salary scale assumption is a long-term estimate derived from historical data, current and recent market expectations and professional judgment.

### Cost-of-Living Allowance

Cost-of-Living Allowances (COLA) are assumed to be 3% of the pension amount, capped at \$390 per year.

### Mortality Rates

RP-2000 Mortality Table (base year 2009) with full generational mortality improvement using Scale BB. For disabled members, RP-2000 Mortality Table (base year 2012) with full generational mortality improvement using Scale BB.

*General Employees:* 55% of deaths are job-related.

*Police and Fire:* 90% of deaths are job-related.

The underlying tables with generational mortality improvement reasonably reflect the mortality experience of the System as of the valuation date based on historical and current demographic data. Further, PERAC reviewed a sampling of a few larger local retirement systems and compared the results with the results found in performing the analysis of the State Retirement System for years 2012 - 2014. For the State Retirement System analysis, the mortality assumptions reflect the recent experience study published in 2014.

### Turnover Rates

Illustrative turnover rates are shown below:

Creditable Service	Groups 1 and 2	Group 4
0	0.1500	0.0150
10	0.0540	0.0150
20	0.0200	0.0000
30	0.0000	0.0000

### Disability Rates

Illustrative disability rates are shown below:

Attained Age	Groups 1 and 2	Group 4
20	0.0001	0.0010
30	0.0003	0.0030
40	0.0010	0.0030
50	0.0019	0.0125
60	0.0028	0.0085

*General Employees:* 55% of disabilities are accidental and 45% are ordinary.

*Police and Fire:* 90% of disabilities are accidental and 10% are ordinary.

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

### Retirement Rates

Illustrative retirement rates are shown below:

	Groups 1 and 2		Group 4
Age	Male	Female	Male & Female
45	0.0000	0.0000	0.0100
46	0.0000	0.0000	0.0100
47	0.0000	0.0000	0.0100
48	0.0000	0.0000	0.0100
49	0.0000	0.0000	0.0100
50	0.0100	0.0150	0.0200
51	0.0100	0.0150	0.0200
52	0.0100	0.0200	0.0200
53	0.0100	0.0250	0.0500
54	0.0200	0.0250	0.0750
55	0.0200	0.0550	0.1500
56	0.0250	0.0650	0.1000
57	0.0250	0.0650	0.1000
58	0.0500	0.0650	0.1000
59	0.0650	0.0650	0.1500
60	0.1200	0.0500	0.2000
61	0.2000	0.1300	0.2000
62	0.3000	0.1500	0.2500
63	0.2500	0.1250	0.2500
64	0.2200	0.1800	0.3000
65	0.4000	0.1500	1.0000
66	0.2500	0.2000	1.0000
67	0.2500	0.2000	1.0000
68	0.3000	0.2500	1.0000
69	0.3000	0.2000	1.0000
70	1.0000	1.0000	1.0000

The turnover, disability and retirement rates are based on PERAC's most recent experience analysis of local retirement systems which reviewed age, gender and job group. The assumptions reflect this analysis as well as professional judgment.

### Actuarial Cost Method

Individual Entry Age Normal.

---

## SECTION 6 - ACTUARIAL ASSUMPTIONS AND METHODS

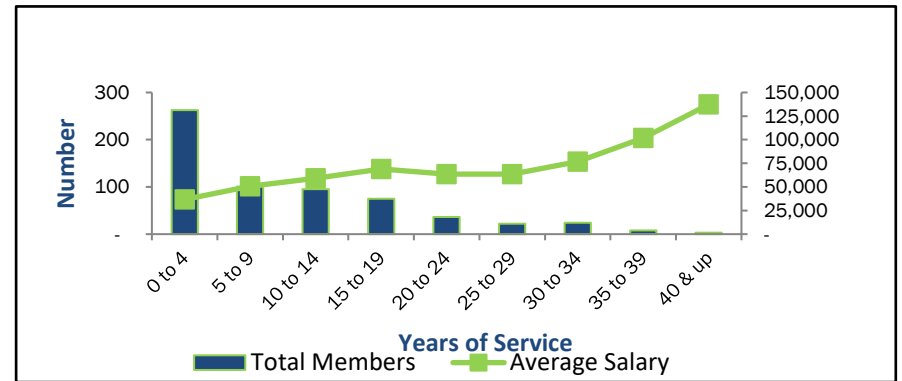
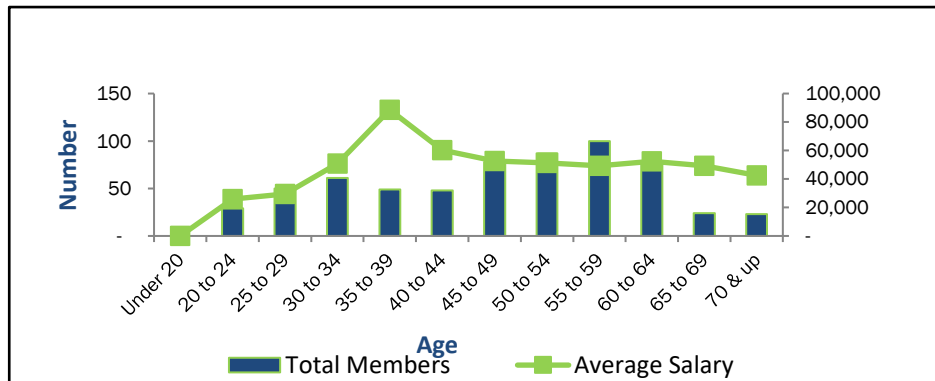
<b>Actuarial Asset Method</b>	<p>The Actuarial Value of Assets is the market value of assets as of the valuation date reduced by the sum of:</p> <ul style="list-style-type: none"><li>a) 80% of gains and losses of the prior year,</li><li>b) 60% of gains and losses of the second prior year,</li><li>c) 40% of gains and losses of the third prior year and</li><li>d) 20% of gains and losses of the fourth prior year.</li></ul> <p>Investment gains and losses are determined by the excess or deficiency of the expected return over the actual return on the market value. The actuarial valuation of assets is further constrained to be not less than 90% or more than 110% of market value.</p>
<b>Census Data</b>	Census data as of the valuation date were submitted by the Retirement Board.
<b>Asset Data</b>	Asset information is reported annually to the Public Employee Retirement Administration Commission by the Hingham Contributory Retirement System.
<b>Dependents</b>	80% of all members will be survived by a spouse. Age assumption for spouses is that males are assumed to be three years older than females.
<b>Net Section 3(8)(c) Transfers</b>	Reimbursements paid to and received from other retirement systems for that portion of a retiree's pension that is based on service earned in another retirement system. Net 3(8)(c) transfers are assumed to be \$0 per year.
<b>Administrative Expenses</b>	<p>The anticipated administrative expenses for the fiscal year. For Fiscal Year 2019, the administrative expenses were assumed to be \$150,000 and are anticipated to increase 4% per year.</p> <p>The administrative expense assumption is based on information relating to the System's administrative expenses provided by the Retirement System.</p>



## SECTION 7 - PLAN MEMBER INFORMATION

Exhibit 7.1 - ACTIVE MEMBERS BY AGE and YEARS OF SERVICE AS OF JANUARY 1, 2018

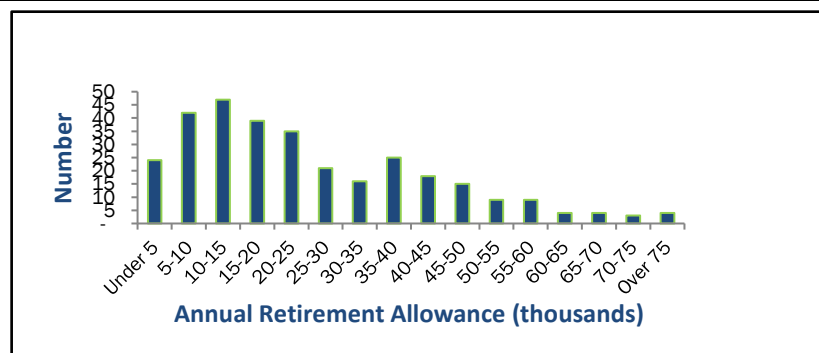
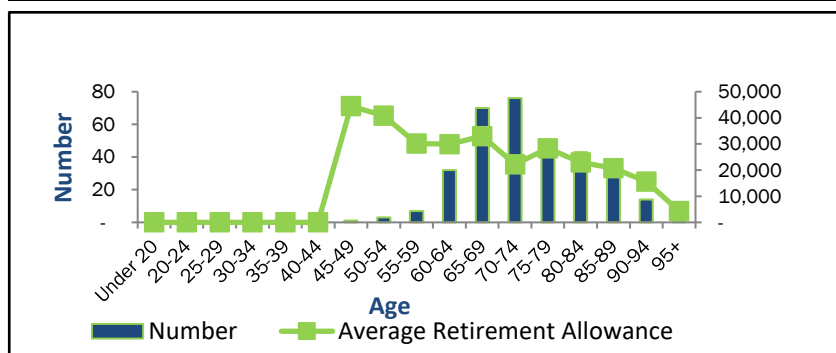
Age	Years of Service									Total	Total Salary	Average Salary
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up			
Under 20	-	-	-	-	-	-	-	-	-	-	-	-
20 to 24	29	-	-	-	-	-	-	-	-	29	750,235	25,870
25 to 29	49	1	-	-	-	-	-	-	-	50	1,474,285	29,486
30 to 34	40	16	5	-	-	-	-	-	-	61	3,102,731	50,864
35 to 39	11	14	20	4	-	-	-	-	-	49	4,341,150	88,595
40 to 44	21	5	9	13	-	-	-	-	-	48	2,894,032	60,292
45 to 49	33	17	8	11	8	1	-	-	-	78	4,108,477	52,673
50 to 54	30	15	14	9	5	4	9	1	-	87	4,467,197	51,347
55 to 59	26	21	15	18	6	7	5	2	-	100	4,917,343	49,173
60 to 64	13	7	17	12	11	7	4	5	2	78	4,088,129	52,412
65 to 69	6	2	6	3	3	-	4	-	-	24	1,185,218	49,384
70 & up	5	3	1	5	3	3	2	-	1	23	980,739	42,641
Total	263	101	95	75	36	22	24	8	3	627	32,309,535	51,530
Average Salary	36,702	50,559	59,118	69,028	63,671	63,408	76,818	101,810	137,285			
Average Age:							48.22	Average Service:		10.16		



## SECTION 7 - PLAN MEMBER INFORMATION

**Exhibit 7.2 - Retired Plan Members and Beneficiaries Annual Pensions as of January 1, 2018**

Attained Age	Service Retirements		Disability Retirements		Beneficiaries	
	Number	Annual Retirement Allowance	Number	Annual Retirement Allowance	Number	Annual Retirement Allowance
Under 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	0	0	0	0	0	0
45-49	0	0	1	44,467	0	0
50-54	1	73,737	1	40,464	1	8,220
55-59	4	153,319	0	0	3	58,287
60-64	28	930,246	0	0	4	27,887
65-69	64	2,186,404	1	42,269	5	78,243
70-74	68	1,462,133	3	123,860	5	101,376
75-79	36	1,064,960	1	43,956	4	53,348
80-84	35	835,405	2	57,688	6	94,748
85-89	22	469,423	0	0	7	130,670
90-94	10	146,850	0	0	4	71,569
95+	2	8,785	0	0	0	0
Total	270	7,331,262	9	352,704	39	624,348
Average Age	74.0		69.2		76.1	
Average Retirement Allowance		27,153		39,189		16,009



---

## SECTION 8 - GLOSSARY OF TERMS

**Actuarial Accrued Liability** – That portion of the Actuarial Present Value of pension plan benefits which is not provided by future Normal Costs or employee contributions. It is the portion of the Actuarial Present Value attributable to service rendered as of the Valuation Date.

**Actuarial Assumptions** – Assumptions, based upon past experience or standard tables, used to predict the occurrence of future events affecting the commencement, amount and duration of pension benefits, such as: changes in compensation, mortality, withdrawal, disablement and retirement; rates of investment earnings and asset appreciation or depreciation; and any other relevant items.

**Actuarial Cost Method (or Funding Method)** – A procedure for allocating the Actuarial Present Value of all past and future pension plan benefits to the current year (Normal Cost) and the past (Actuarial Accrued Liability).

**Actuarial Gain or Loss (or Experience Gain or Loss)** – A measure of the difference between actual experience and that expected based upon the set of Actuarial Assumptions, during the period between the valuation date and the most recent immediately preceding valuation date.

**Actuarial Present Value** – The dollar value on the valuation date of all benefits expected to be paid to current members based upon the Actuarial Assumptions and the terms of the Plan.

**Amortization Payment** – That portion of the pension plan appropriation which represents payments made to pay interest on and the reduction of the Unfunded Accrued Liability.

**Annual Statement** – The statement submitted by the local retirement board to PERAC each year that describes the asset holdings and Fund balances as of December 31 and the transactions during the calendar year that affected the financial condition of the retirement system.

**Annuity Reserve Fund** – The fund into which total accumulated Member Contributions, including interest, is transferred at the time a member retires, and from which annuity payments are made.

**Annuity Savings Fund** – The fund in which Member Contributions plus interest credited are held for active members and for former members who have not withdrawn their contributions and are not yet receiving a benefit (inactive members).

**Assets** – The total value of the investments held by the Plan trust that are for the payment of promised benefits. Employer appropriations and Member Contributions, as well as investment earnings, are added to the Plan trust. Benefit payments and other disbursements are withdrawn from the Plan trust. For valuation purposes, assets are usually measured at market value.

**Cost of Benefits** – The estimated payment from the pension system for benefits for the fiscal year.

---

## SECTION 8 - GLOSSARY OF TERMS

**Expense Fund** – The fund into which the appropriation for administrative expenses is paid and from which all such expenses are paid.

**Funded Ratio** – The Actuarial Value of Assets expressed as a percentage of the Actuarial Accrued Liability.

**Funding Schedule** – The schedule based upon the most recently approved actuarial valuation which sets forth the amount which would be appropriated to the pension system in accordance with Section 22D of M.G.L. Chapter 32.

**GASB** – Governmental Accounting Standards Board.

**Normal Cost** – Total Normal Cost is that portion of the Actuarial Present Value of pension plan benefits which is expected to accrue in the current fiscal year. The Employee Normal Cost is the amount of the expected Member Contributions for the current fiscal year. The Employer Normal Cost is the difference between the Total Normal Cost and the Employee Normal Cost.

**Pension Fund** – The fund into which appropriation amounts as determined by PERAC are paid and from which pension benefits are paid.

**Pension Reserve Fund** – The fund which shall be credited with all amounts set aside by a system for the purpose of establishing a reserve to meet future pension liabilities. These amounts would include excess interest earnings.

**Present Value of Future Benefits** – The actuarial present value of the cost to finance benefits payable in the future, discounted to reflect the expected effects of the time value of money and the probabilities of payment.

**Special Fund for Military Service Credit** – The fund which is credited with amounts paid by the retirement board equal to the amount which would have been contributed by a member during a military leave of absence as if the member had remained in active service of the retirement board. In the event of retirement or a non-job related death, such amount is transferred to the Annuity Reserve Fund. In the event of termination prior to retirement or death, such amount shall be transferred to the Pension Fund.

**Total Pension Liability** – The portion of the Actuarial Present Value attributable to past service in accordance with the Entry Age cost method as stipulated by GASB Statement Number 67 (GASB 67).

**Unfunded Actuarial Accrued Liability** – The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.

## SECTION 9 - RESULTS BY DEPARTMENT

	Town	Light Plant	Housing Authority	SSREC	Total
<b>Summary of Member Data</b>					
Active Members	567	29	5	26	627
Salary	27,912,985	2,744,329	220,715	1,431,506	32,309,535
Average Salary	49,229	94,632	44,143	55,058	51,530
Average Age	48.2	52.1	55.4	42.5	48.2
Average Service	9.9	14.8	6.7	11.1	10.2
Retired Members and Survivors	286	19	1	3	309
Annual Pensions	7,244,978	629,160	13,825	67,647	7,955,610
Average Pension	25,332	33,114	13,825	22,549	25,746
Average Age	74.5	73.3	72.3	65.5	74.3
Disabled Members	8	1	0	0	9
Annual Pensions	310,435	42,269	0	0	352,704
Average Pension	38,804	42,269	0	0	39,189
Average Age	69.2	69.4	0.0	0.0	69.2
Inactive Members	238	4	2	11	255
Annuity Savings Fund	1,868,900	173,323	113,264	66,687	2,222,174
<b>Unfunded Actuarial Accrued Liability - January 1, 2018</b>					
Actuarial Accrued Liability					
Active Employees	68,464,721	8,862,464	414,677	3,178,178	80,920,040
Retired Members and Survivors	68,478,776	5,893,061	174,258	735,463	75,281,558
Disabled Members	3,217,994	422,565	0	0	3,640,559
Inactive Members	1,868,900	173,323	113,264	66,687	2,222,174
Total	142,030,391	15,351,413	702,199	3,980,328	162,064,331
Actuarial Value of Assets	98,879,361	12,956,239	802,240	2,330,083	114,967,923
Unfunded Actuarial Accrued Liability	43,151,030	2,395,174	(100,041)	1,650,245	47,096,408
Funded Ratio	69.6%	84.4%	114.3%	58.5%	70.9%
<b>Normal Cost - January 1, 2018</b>					
Total Normal Cost	4,293,114	471,338	34,375	230,293	5,029,120
Administrative Expenses	128,048	14,058	1,025	6,869	150,000
Total Normal Cost	4,421,162	485,396	35,400	237,162	5,179,120
Employee Normal Cost	(2,436,865)	(246,431)	(19,197)	(128,760)	(2,831,253)
Employer Normal Cost	1,984,297	238,965	16,203	108,402	2,347,867

Hingham Contributory Retirement System  
Actuarial Valuation as of January 1, 2018

---

## SECTION 9 - RESULTS BY DEPARTMENT

### 30-Year Forecast of Annual Appropriations

Year	Town	Light Plant	Housing Authority	SSREC	Total
2019	4,502,044	348,157	13,798	203,844	5,067,843
2020	4,773,356	397,538	10,344	216,015	5,397,253
2021	5,090,917	418,153	10,090	228,914	5,748,074
2022	5,427,901	440,981	9,975	242,842	6,121,699
2023	5,788,472	464,087	9,638	257,412	6,519,609
2024	6,171,545	489,365	9,398	273,076	6,943,384
2025	6,579,257	516,473	9,176	289,798	7,394,704
2026	7,015,028	544,227	8,742	307,363	7,875,360
2027	7,478,336	574,349	8,379	326,194	8,387,258
2028	7,972,166	606,138	7,941	346,185	8,932,430
2029	8,432,511	637,730	7,849	365,314	9,443,404
2030	8,738,172	659,429	7,905	378,198	9,783,704
2031	9,056,124	682,003	7,963	391,601	10,137,691
2032	9,403,972	707,550	8,164	406,479	10,526,165
2033	9,743,930	731,493	8,195	420,760	10,904,378
2034	10,108,823	757,758	8,319	436,233	11,311,133
2035	10,490,609	785,350	8,469	452,449	11,736,877
2036	3,230,140	388,999	26,375	176,463	3,821,977
2037	3,341,038	402,354	27,281	182,521	3,953,194
2038	3,450,297	415,512	28,173	188,490	4,082,472
2039	3,552,133	427,776	29,005	194,053	4,202,967
2040	3,667,862	441,713	29,950	200,376	4,339,901
2041	3,777,395	454,903	30,844	206,359	4,469,501
2042	3,895,140	469,083	31,805	212,792	4,608,820
2043	4,014,499	483,458	32,780	219,313	4,750,050
2044	4,137,876	498,315	33,787	226,053	4,896,031
2045	4,277,256	515,101	34,926	233,667	5,060,950
2046	4,427,973	533,251	36,156	241,901	5,239,281
2047	4,585,233	552,190	37,440	250,492	5,425,355
2048	4,756,416	572,805	38,838	259,843	5,627,902

## SECTION 9 - RESULTS BY DEPARTMENT

### Allocation of Actuarial Value of Assets

Department	Town	Light Plant	Housing Authority	SSREC	Total
<b>Actuarial Value of Assets, January 1, 2017</b>					
AVA, 1/1/2016	87,416,823	11,394,964	701,072	1,505,969	101,018,828
Contributions					
Member	2,567,631	249,198	99,599	134,568	3,050,996
Employer	4,022,583	279,906	8,859	216,763	4,528,111
Other Receipts	285,674	22,936	4,701	15,230	328,541
Benefit Payments	(7,200,654)	(592,780)	(33,254)	(87,035)	(7,913,723)
Refunds	(316,823)	(27,423)	(74,598)	(10,901)	(429,745)
Other Disbursements	(300,734)	(24,811)	(4,315)	(3,918)	(333,778)
Investment Return	5,832,862	761,327	47,066	109,909	6,751,164
AVA, 1/1/2017	92,307,362	12,063,317	749,130	1,880,585	107,000,394
<b>Actuarial Value of Assets, January 1, 2018</b>					
AVA, 1/1/2017	92,307,362	12,063,317	749,130	1,880,585	107,000,394
Contributions					
Member	2,561,717	264,663	21,399	168,463	3,016,242
Employer	4,221,102	331,435	13,756	192,245	4,758,538
Other Receipts	270,269	23,752	1,401	14,373	309,795
Benefit Payments	(7,401,449)	(684,928)	(28,885)	(87,929)	(8,203,191)
Refunds	(299,234)	-	(13,948)	-	(313,182)
Other Disbursements	(315,150)	(28,031)	(1,753)	(3,598)	(348,532)
Investment Return	7,534,744	986,031	61,140	165,944	8,747,859
AVA, 1/1/2018	98,879,361	12,956,239	802,240	2,330,083	114,967,923